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DEPARTMENT OF FISH AND GAME

FEDERAL AID IN FISH RESTORATION
2001 Job Performance Report
Program F-71-R-26

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS
SOUTHEAST REGION (Subprojects I-F, II-F, III-F)

PROJECT I. SURVEYS AND INVENTORIES
Job b. Southeast Region Lowland Lakes Investigations
Job c. Southeast Region Rivers and Streams Investigations
PROJECT II. TECHNICAL GUIDANCE
PROJECT III. HABITAT MANAGEMENT

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IDFG 02-29

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2001 ANNUAL PERFORMANCE REPORT

State of: Idaho

Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories

Subproject I-F: Southeast Region

Job: b

Title: Lowland Lakes Investigations

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

General lowland lake surveys were completed on Blackfoot, Oneida, Alexander, and Chesterfield reservoirs. Data from the surveys showed that Utah chub *Gila atraria* dominated the fish community in Chesterfield and Blackfoot reservoirs. The relative species composition in Oneida Reservoir has changed markedly since the 1980s. Yellow perch *Perca flavescens* declined while common carp *Cyprinus carpio* and walleye *Stizostedion vitreum* abundance increased. Yellow perch and carp dominated the catch in Alexander Reservoir.

During the seven-month creel survey on Blackfoot Reservoir, anglers fished an estimated 54,831 hours (7.5 h/ha). Anglers caught a total of 8,811 trout (1.2 trout/ha). Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri* made up 25% (2,162 fish) of the total catch. Anglers caught 6,649 rainbow trout *O. mykiss* of which 91% were harvested. Using the mean stocking effort during the previous four years, overall return of rainbow trout stocked as catchables was 2.0% by number and 15.4% by weight. For fingerlings plants, 0.3% were caught by number and 63.7% by weight.

Stocking catchable rainbow trout in Blackfoot Reservoir is prohibitively expensive. Between 1998 and 2001, annual stocking effort averaged 1,590,000 sub-catchables (fry and fingerlings) and 56,000 catchables. Total trout mass stocked averaged 21,555 kg. Assuming a cost of $3.86/kg ($1.75/lb) of trout produced the current stocking program for Blackfoot Reservoir costs about $83,202.00 per year. Estimated cost by release group was $36,346.00 for catchables and $46,857.00 for subcatchables. Cost per fish caught by release strategy was an estimated $32.15 for catchables and $8.49 for fingerlings.

In 2001, we initiated a monitoring program for yellow perch in Blackfoot Reservoir. Yellow perch were illegally introduced sometime during the 1990s. A bottom trawl was used to monitor perch abundance. The trawling survey was completed on October 15 and yellow perch were caught in every trawl (n = 12). Catch of yellow perch ranged from 7 to 564 per trawl with a mean of 142. Arial densities ranged from 73 to 5,907 yellow perch/ha with a mean of 1,506.

To reduce Utah chub abundance, Chesterfield Reservoir and its major tributary were treated with 3 ppm rotenone concentration. A summary of treatment water included: 800 m of unnamed stream originating at Warm Springs, 3,700 m of the Portneuf River above the normal high water mark of the reservoir, 9,500 m of the Portneuf River that is normally inundated by the reservoir, and 3.5 ha of the reservoir.

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OBJECTIVES

1. To obtain current information for fishery management decisions on lowland lakes and reservoirs, including angler use, success, harvest and opinions, fish population characteristics, stocking success, return-to-creel for hatchery trout, limnology and develop appropriate management recommendations.

INTRODUCTION AND METHODS

Lowland Lake Surveys

We completed four lowland lake and reservoir surveys in 2001 (Blackfoot, Oneida, Chesterfield and Alexander reservoirs). When a lowland lake survey was conducted, the following standardized gear types were used. One unit of effort for each of the gear types combined equals one unit of "sampling effort." The minimum standard amount of sampling effort is dependent upon the size of the body of water.

1. Gill nets – floating and sinking monofilament nets, 46 m x 2 m, with six panels composed of 19, 25, 32, 38, 51, and 64 mm bar mesh. One floating and one sinking net combined, fished overnight, equal one unit of gill net effort.

2. Trap nets – 15 m lead, 1 m x 2 m sized frame, crowfoot throats on the first and third of five loops, 19 mm bar mesh, treated black. One trap net fished overnight equals one unit of trap net effort.

3. Electrofishing – a pulsed DC electrofishing boat with boom-mounted electrodes. One hour of current-on electrofishing equals one unit of electrofishing effort.

Blackfoot Reservoir

Blackfoot Reservoir is located on the Blackfoot River in Caribou County, north of Soda Springs. Its primary uses are irrigation storage and flood control. The US Bureau of Indian Affairs regulates the dam and reservoir. At full capacity, the reservoir is at 1,865 m elevation, covers 7,285 ha and contains 432,000,000 m^3 of water. Refilling begins in October and continues through spring. Irrigation use begins in June with drawdown beginning as irrigation demand exceeds inflow.

Historically, Blackfoot Reservoir was a premier fishery for large size (>500 mm) Yellowstone cutthroat trout *Oncorhynchus clarki bouvieri*. The fishery slowly deteriorated and eventually crashed in the early 1980s. In 1989, a comprehensive plan to reestablish a fishery for wild Yellowstone cutthroat trout was formulated after several years of study (Schill and LaBolle 1990). It called for elimination of wild cutthroat trout harvest from Blackfoot Reservoir. In order to provide a harvest fishery, large numbers of both hatchery rainbow trout

O. mykiss and hatchery Bear Lake cutthroat trout *O. clarki utah* were stocked. Attempts were made for Bear Lake cutthroat trout to establish their own wild spawning run into the Little Blackfoot River. Bear Lake cutthroat trout stocking was discontinued in 1994. Rainbow trout stocking was increased as a replacement.

Chesterfield Reservoir

Chesterfield Reservoir is located on the Portneuf River in Caribou County. Its primary uses are irrigation storage and flood control. The dam and reservoir are owned and operated by the Portneuf-Marsh Valley Canal Company. At full capacity, the reservoir is at 1,645 m elevation, covers 647 ha and contains 29,200,000 m^3 of water. Refilling begins in October and continues through early spring. Irrigation use generally begins in June with drawdown beginning as irrigation demand exceeds inflow.

Chesterfield Reservoir is managed as a put-and-grow trout fishery with excellent growth and significant numbers of carryover fish. Hatchery rainbow trout dominate the catch with occasional reports of wild cutthroat trout and hatchery brown trout *Salmo trutta* being taken. Most stocking is done with catchable and fingerling size rainbow trout. Plants of 5,000-10,000 fingerling brown trout were also frequent during the mid-1990s. In 1992, Department personnel chemically renovated Chesterfield Reservoir to rid it of undesirable species, specifically Utah chub and common carp *Cyprinus carpio*. Fish species currently found in Chesterfield Reservoir include brown trout, cutthroat trout, rainbow trout, cutthroat-rainbow trout hybrids, Utah chub, and mountain sucker *Catostomus platyrhynchus*.

Oneida Reservoir

Oneida Reservoir is a mainstem impoundment on the Bear River. Marginal water quality and abundant nongame fish led to the decision to introduce walleye *Stizostedion vitreum* as a predator in 1974. The stock is maintained by annual stocking of 500,000 newly hatched fry from North Dakota. Since Oneida Reservoir has a very rapid turnover rate, as fast as every 3 days in high precipitation years and as slow as every 12 days in drought years, zooplankton abundance is too low to expect good walleye growth or fry survival. Additionally walleye fry may be carried from the reservoir with the current. Thus, only a fair walleye fishery can be expected in Oneida Reservoir.

Alexander Reservoir

Alexander Reservoir is a 408 ha impoundment on the Bear River constructed to create hydrological head for power production. Full pool volume is 1,944 hectare-meters and mean retention time ranges from 3 days in abundant precipitation years like 1994 to over 12 days in drought years like 1991. Both retention times are extremely low and preclude development of an abundant zooplankton food base (Scully et al. 1995). Additional limitations on plankton production are caused by suspended sediment that limits Secchi disc depth of visibility to 0.3 m in the headwaters and generally less than 1.5 m near the dam (Scully et al. 1993). During the

winter of 1990-1991, Utah Power and Light drained Alexander Reservoir to repair the dam, and the action may have evacuated many fish from the reservoir. Pre-spawn white crappie *Pomoxis annularis* and 20 cm channel catfish *Ictalurus punctatus* were stocked into Alexander Reservoir in 1991 from west Idaho's Brownlee Reservoir and from an Oklahoma hatchery, respectively. We conducted lowland lake surveys at Alexander Reservoir in 1992, 1995, and again in 2001.

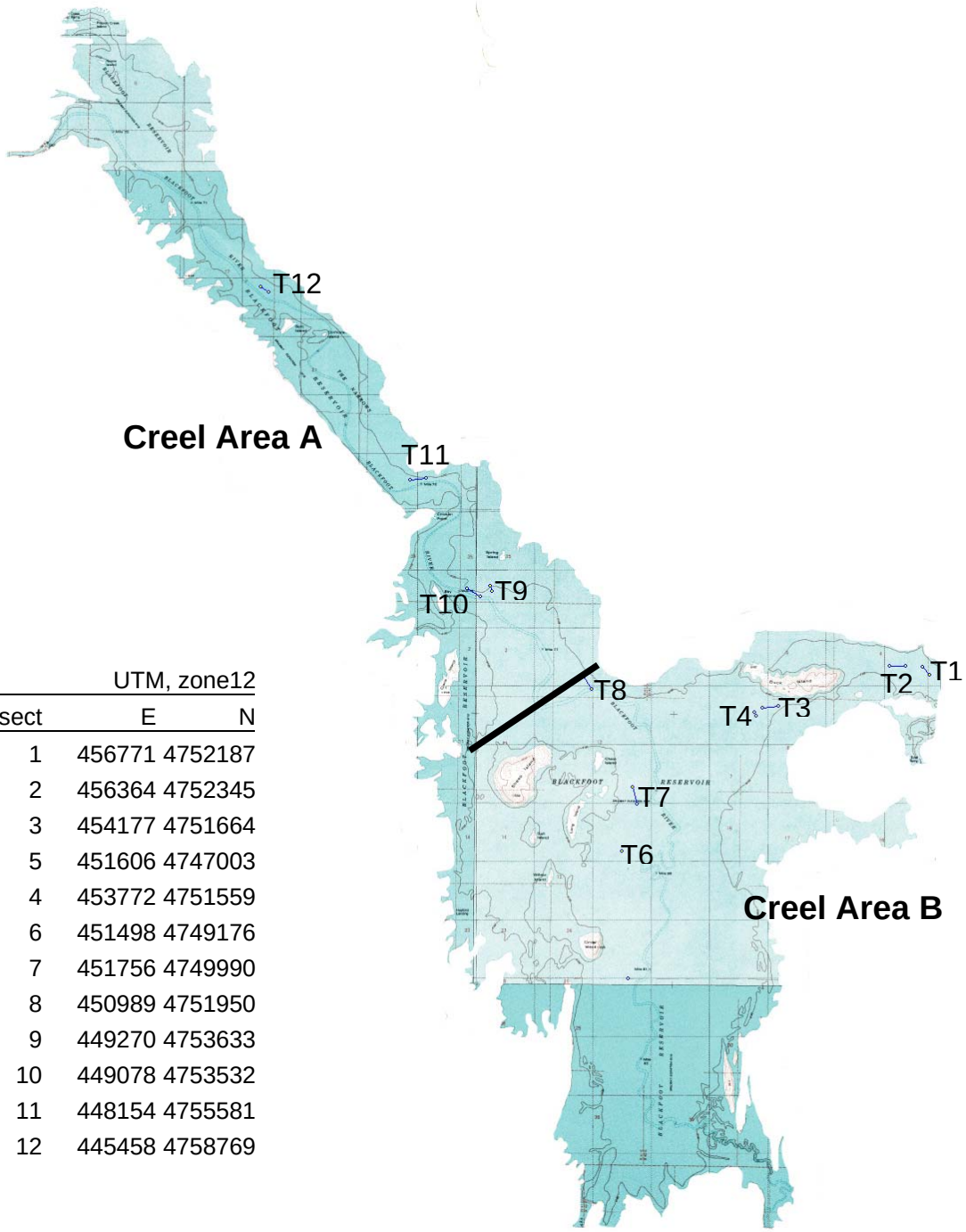
Blackfoot Reservoir Creel and Yellow Perch Trawl Surveys

Creel Survey

The creel survey was conducted from April through October 2001. The survey provided angling success, monitored cutthroat trout catch, and completed a performance evaluation between fingerling and catchable rainbow trout plants. Creel clerks surveyed anglers twice a week, once on a weekday and once on a weekend. The reservoir was divided into two sections (Figure 1). Survey periods (a.m. vs. p.m.), sections (A vs. B), and days of the week were randomly selected. During each individual survey day, the clerk first made an absolute count of all anglers (boat and shore) within that section. The clerk then proceeded to interview as many anglers as possible before completing a second count at the end of the survey period. Angler counts for one section were used to estimate total number of anglers for the entire reservoir based on the relative numbers of anglers fishing each section.

The creel survey was used to complete a comparison of the performance of catchable and fingerling rainbow trout. Beginning in 1998, catchable rainbow trout were marked with an ad-clip prior to release. Fingerlings were not marked. Creel clerks checked for adipose clip on all harvested rainbow trout. We assumed that all of the rainbow trout with adipose fins were stocked as fingerlings. Total catch was computed separately for the two stocking strategies.

Cost per fish caught was the primary measure of performance used to compare the two stocking strategies. Idaho Department of Fish and Game (Department) estimated that the cost of rainbow trout production in 1997 was $3.26 per kg (IDFG 1997). Accounting for inflation, production costs in 2001 would be an estimated $3.86 per kg. Average stocking effort since 1998 has been about 9,416 kg ($36,346.00) for catchables and 12,139 kg ($46,857.00) for fingerlings. The mean stocking effort was used to estimate costs because actual return data by age was not available. To estimate cost per fish caught, we divided the mean stocking cost by the estimated total catch of rainbow trout stocked as fingerlings and catchables in the 2001 creel. For example, if total catch of catchable rainbow trout was 10,000, then the cost per catchable caught would be $3.63 ($36,346.00/10,000). In addition to using the average stocking effort, we estimated cost using the lowest dollar value or stocking effort for the reservoir over the last four years. Using the lowest production cost provides the absolute best-case scenario for costs per fish caught comparisons. Between 1998 and 2001, the lowest stocking effort for catchables was about 6,827 kg ($26,352.00). For fingerlings, between 1998 and 2000, the lowest stocking effort was 10,258 kg ($39,596.00). The number of fingerlings and catchables caught during the 2001 creel was divided by those cost estimates.



	UTM, zone12	
Transect	E	N
1	456771	4752187
2	456364	4752345
3	454177	4751664
5	451606	4747003
4	453772	4751559
6	451498	4749176
7	451756	4749990
8	450989	4751950
9	449270	4753633
10	449078	4753532
11	448154	4755581
12	445458	4758769

Figure 1. Blackfoot Reservoir map showing yellow perch trawling transects and the creel survey areas (A and B). Yellow perch trawling transects are indicated with a capital T followed by the trawl number. GPS locations for each otter trawl are shown on the left.

A historical perspective of fishing success in Blackfoot Reservoir is also provided in this report. Stocking records, water storage in the reservoir, and catch rates were included in the correlation analysis. The goals of the analysis were to determine if stocking effort made a difference in angling success and if water storage impacts catch rates. Since 1964, 22 summer creel surveys have been completed on Blackfoot Reservoir. We obtained stocking records and water conditions (maximum and minimum storage) for all years between 1964 and 2001. For the correlation analysis, we incorporated one- and two-year lags to account for delayed return-to-creel expected for fingerling and catchable plants.

Yellow Perch Trawl Survey

Yellow perch were illegally introduced into Blackfoot Reservoir sometime in the 1990s. The first yellow perch sampled by the Department was collected in a lowland lake survey in 1999. No yellow perch were sampled in a similar survey completed in 1997. The introduced population may compete with or prey on the existing fish complex. Yellowstone cutthroat trout is one of the many species in the reservoir that may be impacted. To evaluate the potential interactions, we established a trawling program to monitor yellow perch abundance. Methods for the trawling program were similar to those used for yellow perch monitoring on Cascade Reservoir, (Paul Janssen 2002, IDFG, personal communication).

An otter trawl was used to estimate the abundance of yellow perch. The trawl samples a 3.35 m wide swath. The bottom of the net drags along the substrate, and the top of the net is suspended by floats about 0.5 meters off the bottom. The net is fitted with 39 mm stretch mesh body and 13 mm mesh cod end. The net was pulled at a speed of 4.0 km/hr for 5 minutes. A total of 12 trawls were completed. Figure 1 shows transect locations. A global positioning system was used to record UTM coordinates at the start and end points of each transect. The coordinates were also used to estimate transect distance and area surveyed. Areal densities were estimated by dividing the number of fish caught in each trawl by the area sampled.

Chesterfield Renovation Project

Chesterfield Reservoir is the most popular sport fishery in southeast Idaho. In 1994, fishing pressure was 245 h/ha. Yield was 110 trout/ha, and a total of 116,300 trout were caught by anglers. An estimated 67% of the fish stocked in the reservoir were harvested. The success of the fishery, however, is dependent on controlling Utah chub densities. The fishery peaks two to three years after Utah chub densities have been reduced by renovation with rotenone. The last rotenone treatment was completed in 1992. Since then, Utah chub abundance has increased markedly.

Drought conditions in 2000 and 2001 resulted in October storage of less than 0.5% of full pool. Surface area was about 3.5 ha with a mean depth of less than 0.5 m. The low water condition combined with an increasing Utah chub population provided the rational and ideal logistic conditions to renovate the reservoir. The reservoir and its major tributary were treated with 3 ppm rotenone on September 14-15, 2001. Figure 2 shows the areas treated. A drip station was placed at the head of Warm Springs, which made up most of the flow in the Portneuf River above the reservoir. The drip station was initiated at 1900 on September 14 and operated to stock the stream with 3 ppm of rotenone. The start time of the drip station was estimated so that the treated water would reach the reservoir by 0900 on September 15. The outlet of the reservoir was completely shut off at 0800. At the same time, we began treating the 3.5 ha pool of the reservoir. Because all of the rotenone was contained in the reservoir and upper stream tributaries, a detoxifying station was not needed. A summary of the water treated included 800 m of unnamed stream originating at Warm Springs, 3,700 m of the Portneuf River above the normal high water mark of the reservoir, and 9,500 m of the Portneuf River that is normally inundated by the reservoir (Figure 2). The treatment removed substantial numbers of Utah chub at the head of Warm Springs and the Portneuf River. Few fish remained in the 3.5 ha pool of the reservoir. In 2002, we will evaluate the success of the treatment by completing a general lowland lake survey and monitoring zooplankton densities.

RESULTS AND DISCUSSION

Lowland Lake Surveys

Blackfoot Reservoir

We caught a total of 954 fish in the lowland lake survey on Blackfoot Reservoir. Similar to all of the summer surveys completed at Blackfoot Reservoir since 1967, trout made up less than 10% of the relative species composition (Table 1). Since 1967, Utah sucker relative abundance declined with an associated increase in the relative species composition of Utah chub (Figure 3). Utah sucker comprised about 50% of the fish sampled in 1967 and only 12% in 2001. The illegally introduced yellow perch population accounted for 5.4% of the relative species contribution in 2001. No yellow perch were collected in a similar survey completed in 1997. Several year classes of yellow perch were collected in the 2001 gill net samples (Figure 4). Mean total lengths of Yellowstone cutthroat and rainbow trout sampled were 501 mm and 381 mm, respectively. Length frequencies for all fish sampled in the lowland lake survey are shown in Figure 4.

Chesterfield Reservoir

We caught 174 fish during the lowland lake survey on Chesterfield Reservoir. Relative species composition was 42% rainbow trout and 53% Utah chub (Figure 5). Utah chub made up only 16% of the relative species composition in 1997. The mean length of rainbow trout in Chesterfield Reservoir was 355 mm. Relative weights of the rainbow trout in Chesterfield Reservoir were 118%. The relative weight values were surprising given the increase in Utah chub abundance and associated decline in zooplankton quality (Scully et al. 2002). Since

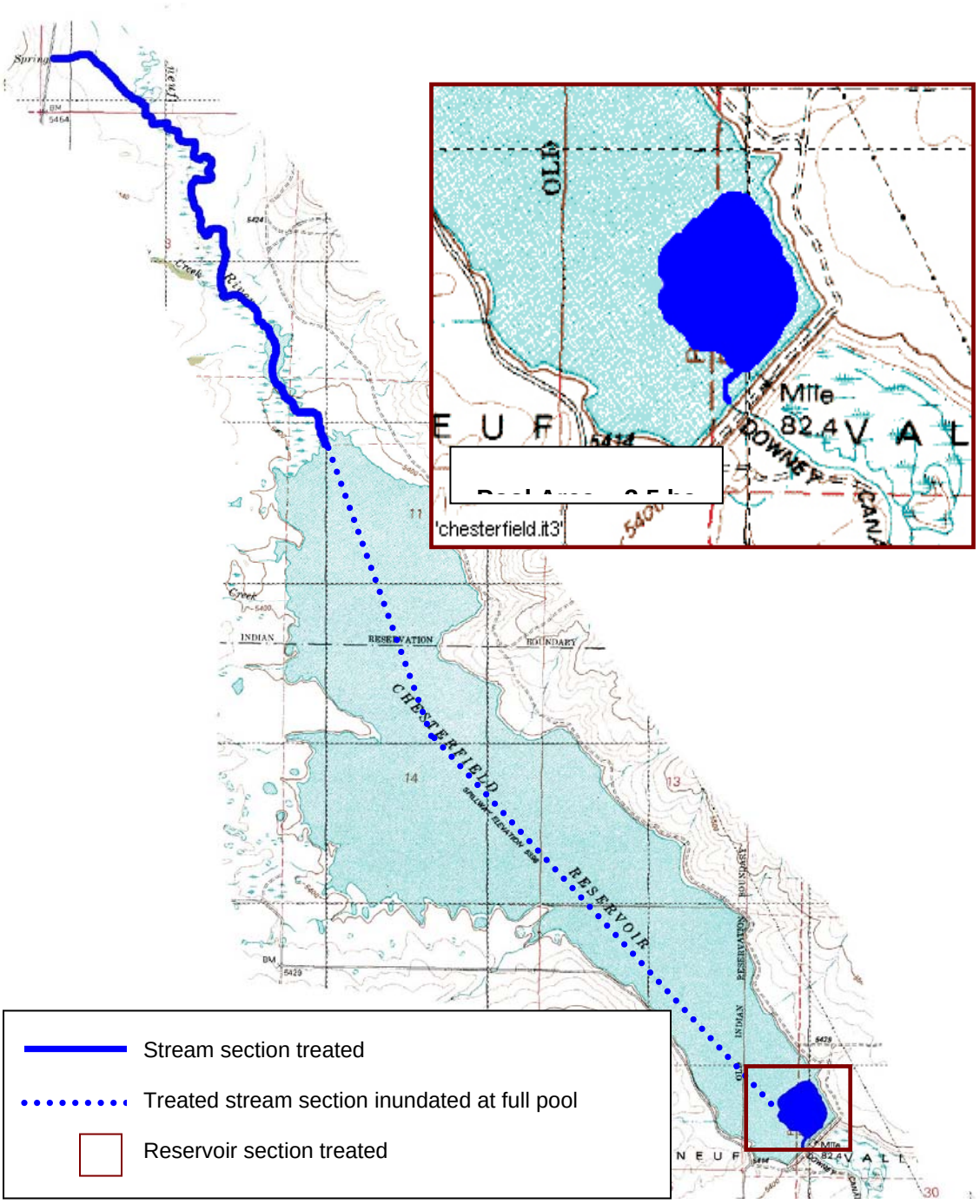


Figure 2. Rotenone treatment areas on Spring Creek, the Portneuf River, and Chesterfield Reservoir. The dark shaded area in the lower portion of the reservoir contained water. The rest of the reservoir was dry. The old Portneuf River channel that is normally inundated (dashed line) with water was also treated along with the highlighted section of river above the normal reservoir pool.

Table 1. Summary of gill net data from Blackfoot Reservoir from 1963 to 2001.

Date	Nets	Total catch	RBT	CT	Total trout	Percent trout	UC	US	CP	YP	Total non-trout	Percent non-trout
May 1963	2					31						69
May 1964						25						75
May 1967	4	348			13	4					335	96
June 1968		270	15	4	19	8	122	129			251	92
July 1971	10	361	4	7	11	3	170	168	12		350	97
Aug 1971	10	421	5	9	14	3	286	115	6		407	97
June 1980	12	865	16	19	35	4	556	272	2		830	96
Oct 1980	11	820	55	91	146	18	530	142	2		674	82
July 1991		273	1	7	8	3	216	49			265	97
July 1997		389	6	6	12	3	351	22	4		377	97
July 1999	6	1,528	22	1	23	2	1,291	200	7	7	1,505	98
July 2001	12	954	17	5	22	2	748	101	15	51	932	98

CT = cutthroat trout, RBT = rainbow trout, UC = Utah chub, US = Utah sucker, YP = yellow perch, CP = common carp

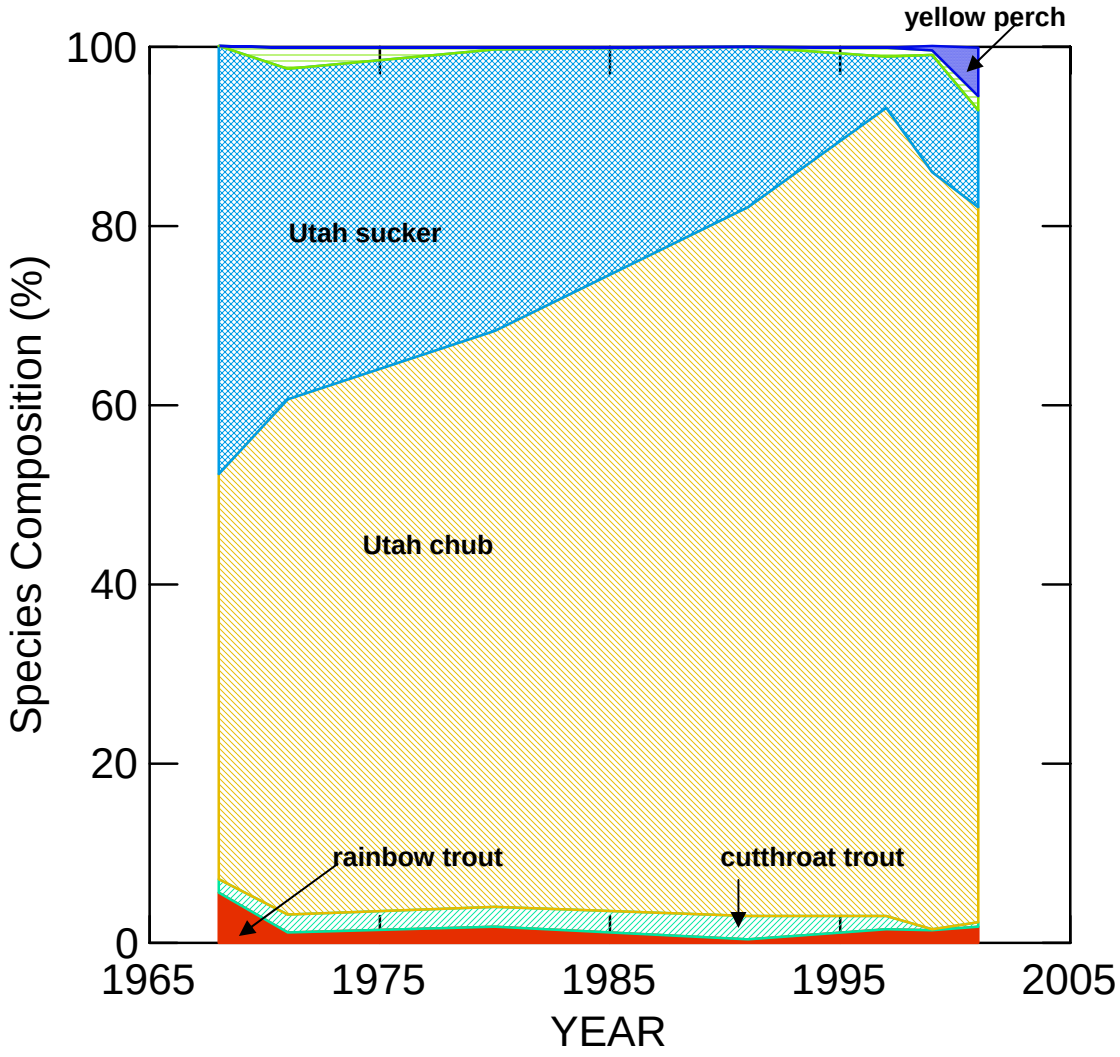


Figure 3. Relative species composition of gill net caught fish in Blackfoot Reservoir since 1967.

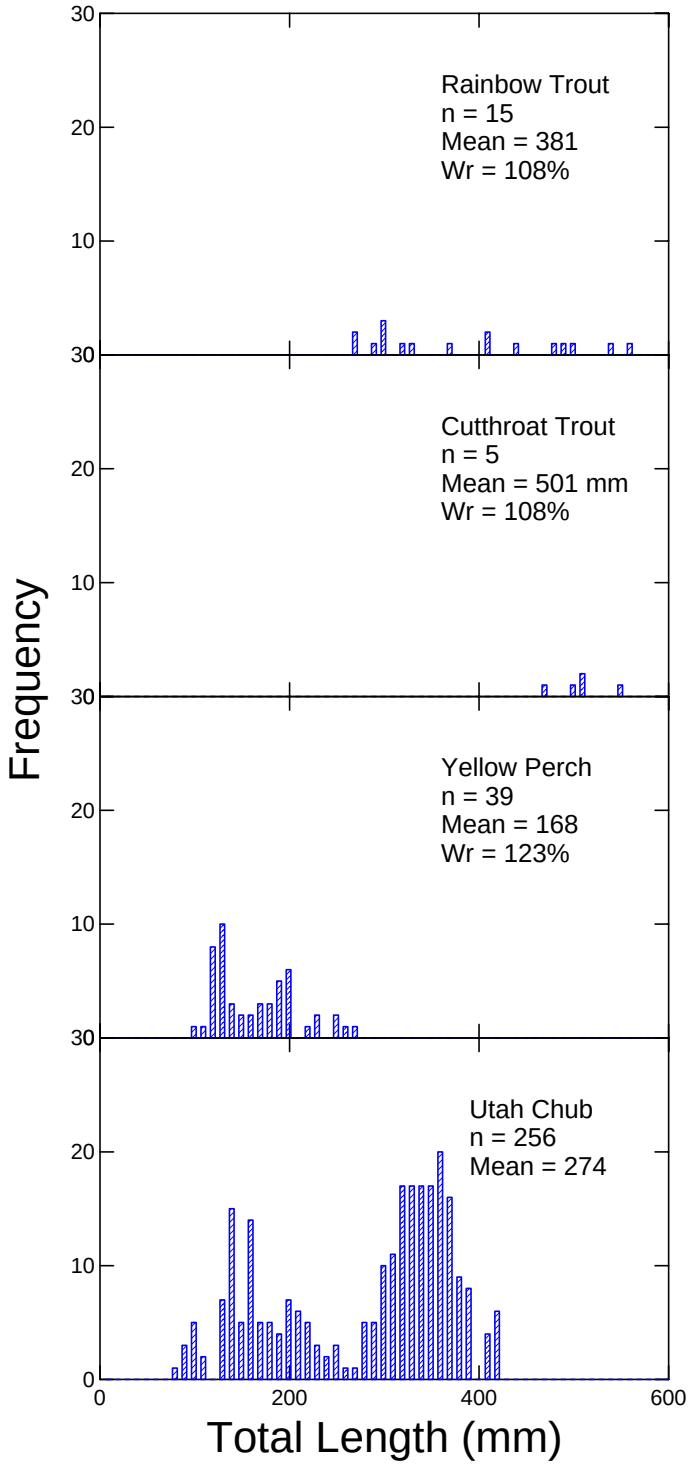


Figure 4. Length frequency distributions for rainbow trout, cutthroat trout, and Utah chub caught in the lowland lake survey completed on Blackfoot Reservoir, 2001.

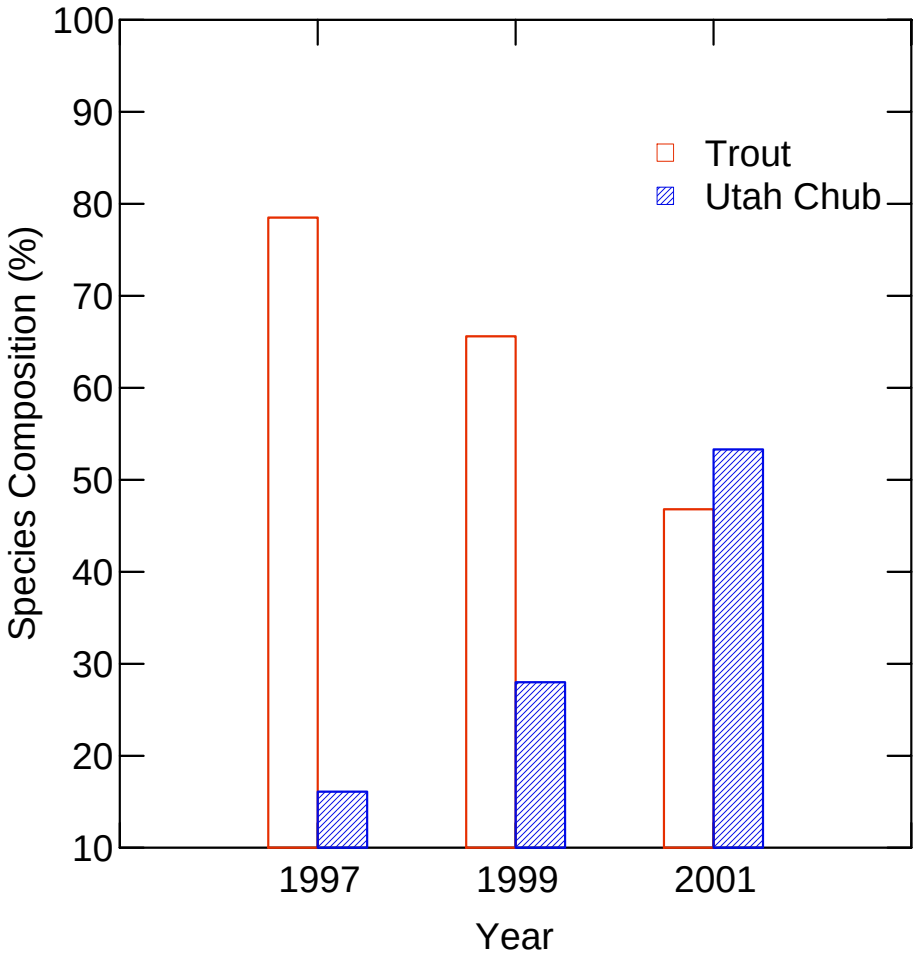


Figure 5. Relative species composition in Chesterfield Reservoir between 1997 and 2001.

1999, due to the poor zooplankton quality (size and abundance), only catchable-size rainbow trout have been stocked in Chesterfield Reservoir. The high relative weights suggest that the abundance of mollusks and chironomids can maintain growth of catchable sized rainbow trout. Fingerling planted rainbow trout, however, are more dependent of zooplankton for forage and do not appear to survive and grow well in the presence of Utah chub populations.

Oneida Reservoir

A total of 317 fish were collected during the lowland lake survey on Oneida Reservoir. Common carp dominated the catch (42.2%) followed by green sunfish *Lepomis cyanellus* (22.4%), yellow perch (13.6%), walleye (12.3%), and smallmouth bass *Micropterus dolomieu* (8.5%). Figure 6 shows gill net catch proportions since the late 1970s. Since 1973, yellow perch declined from 92% of the gill net catch to only 14% in 2001. Converse to the yellow perch trends, walleye have increased in the catch. Carp also appear to be increasing in relative abundance (Figure 6).

Walleye condition (relative weight) increased from 79% in 1997 to 105% in 2001. Except for the 2001 sample, relative weights of walleye collected during the lowland lake surveys fell below the standard weight-length relationship (Figure 7). Cohort strength and dominant year classes in the reservoir have been variable and may be related to water conditions. Young-of-year walleye are especially susceptible to low water residency time. Water residency time in Oneida Reservoir can be as low as three days. Flushing may be responsible for the loss of several cohorts of walleye observed in 1992 but absent from the catch in years following high runoff (1993-1996; Figure 8).

Alexander Reservoir

A total of 368 fish were sampled during the lowland lake survey completed on August 8, 2001. Yellow perch comprised 56% of the relative species composition followed by common carp (35.9%) and Utah sucker (6.2%). Three distinct cohorts of yellow perch were discernible from the length distribution (Figure 9). Despite the stocking program and anecdotal reports of anglers catching them, channel catfish were not sampled by gill nets, trap nets, or electrofishing.

Blackfoot Reservoir Surveys

Creel Survey

During the seven-month creel survey, anglers fished an estimated 54,831 h (7.5 h/ha). Angling effort was concentrated during the spring fishing season. Combined effort in May and June accounted for 64% of the total hours fished. During that period, effort was roughly equal between boat and bank anglers. By August, however, most of the angling effort was expended by boat (Figure 10). The overall catch rate on Blackfoot Reservoir was 0.16 fish/h. Success rates peaked at about 0.38 fish/h in May and declined precipitously through October (Figure 10).

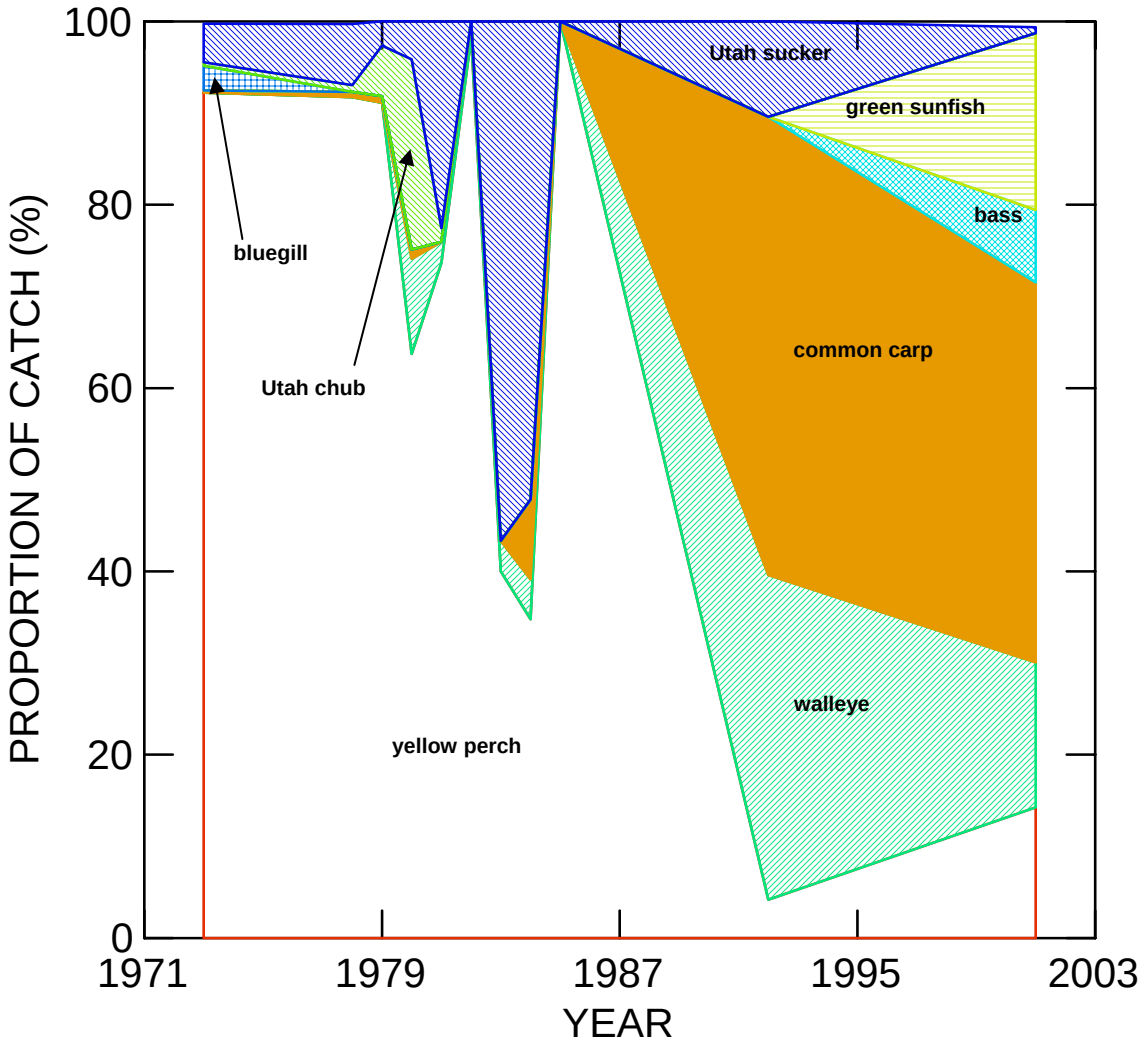


Figure 6. Relative species composition from gill net catch in Oneida Reservoir.

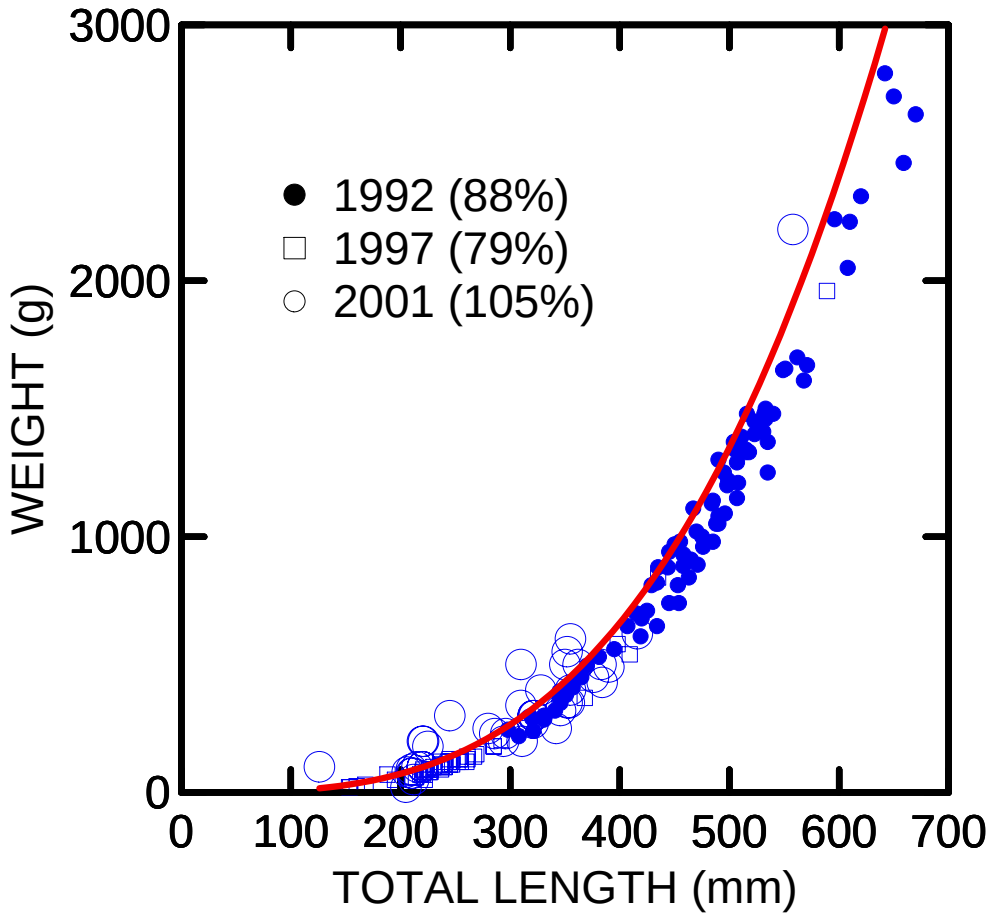


Figure 7. Length-weight relationship for walleye in Oneida Reservoir. The solid line represents the standard equation for walleye. Most of the fish measured in 1992 and 1997 fall below the standard weight equations. Conversely, most of the walleye sampled in 2001 were above the standard weight equations. Mean relative weight values for each year are in parenthesis.

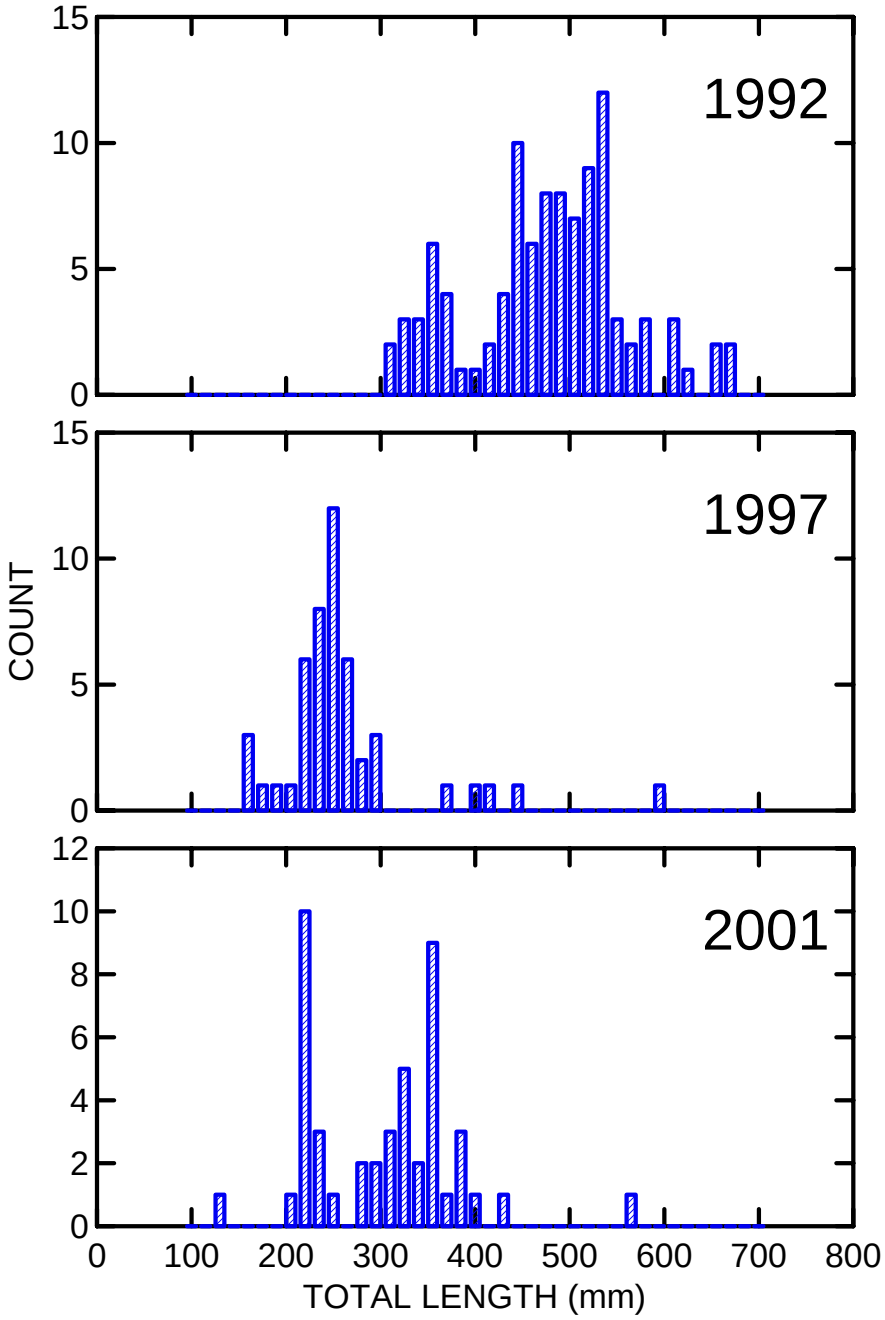


Figure 8. Length frequency distribution for walleye caught in Oneida Reservoir in 1992, 1997, and 2001.

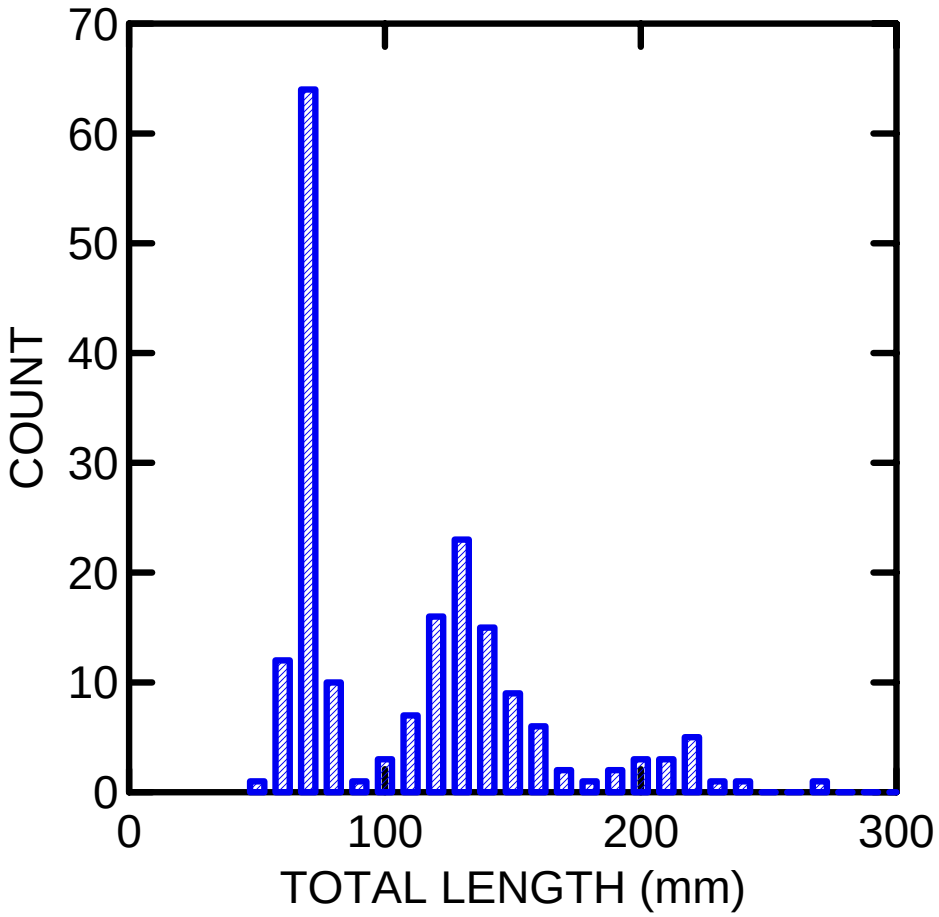


Figure 9. Length frequency distribution for yellow perch caught in Alexander Reservoir in 2001.

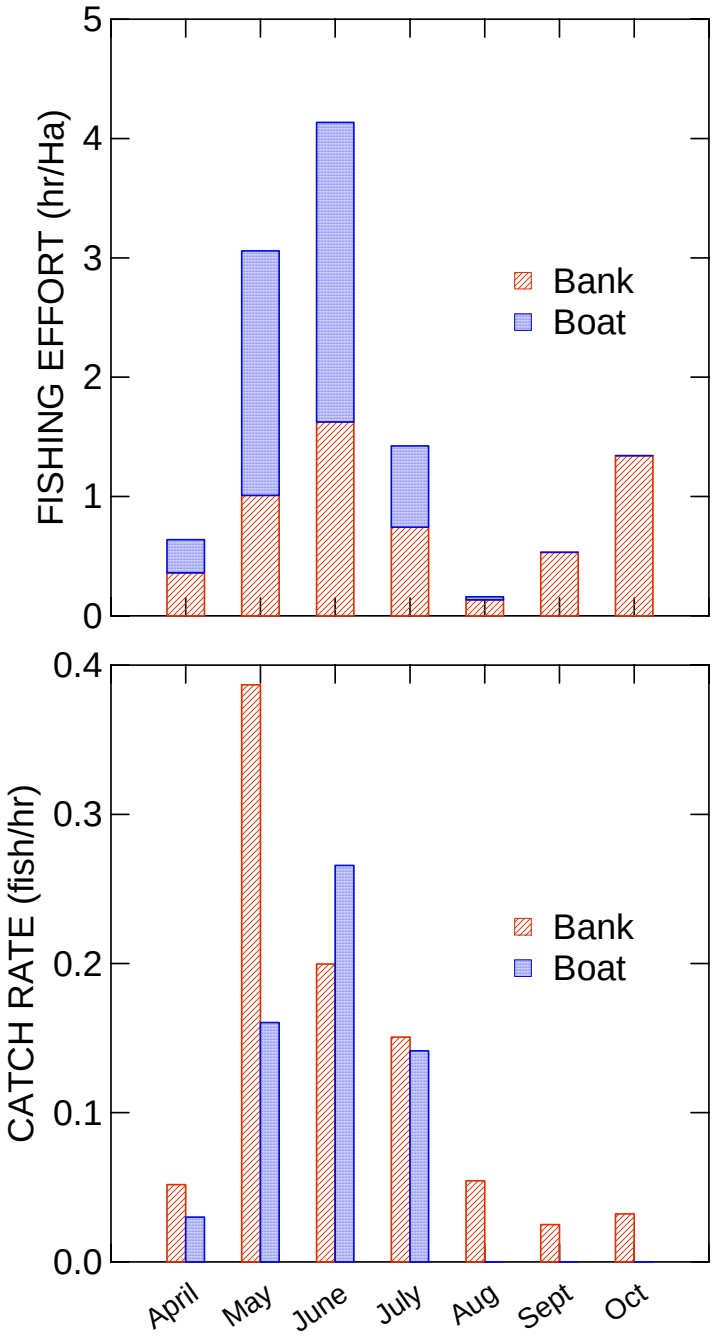


Figure 10. Fishing effort and catch rate for bank and boat anglers on Blackfoot Reservoir, 2001.

Both hatchery stocked rainbow trout and naturally produced Yellowstone cutthroat trout contributed to angler catch (Figure 11). Anglers caught a total of 8,811 trout (1.2 trout/ha). Yellowstone cutthroat trout made up 25% (2,162 fish) of the total catch, which was up from only 4% of the total trout catch in a 1997 creel. Schill and LaBolle (1990) reported that 5% of the trout caught on the reservoir were native cutthroat trout. In 2001, anglers caught 6,649 rainbow trout of which 91% were harvested. Adipose-clipped (catchable plants) rainbow trout accounted for 17% (1,130) of the catch. The remainder of the rainbow trout (83%; n = 5,519) were assumed to be fish stocked as fingerlings.

The length of rainbow trout measured in the 2001 creel survey differed from past observations (Figure 12). The mean size of rainbow trout in the creel was 471 mm for catchables and 482 mm for fish stocked as fingerlings. Only 10% of the fish creeled were less than 400 mm TL. In contrast, during a 1984 creel survey, 65% of rainbow trout creeled were less than 400 mm TL and two different cohorts were distinguishable. At least two cohorts of rainbow trout also appeared visible from the 1997 creel survey (Figure 12). The paucity of creeled rainbow trout less than 400 mm in the 2001 survey indicated that catchables stocked in 2000 and 2001 were failed stocking events.

Return-to-creel of hatchery stocked rainbow trout in Blackfoot Reservoir does not meet Department stocking goals. Stocking goals are 100% return by weight for fry and fingerling plants (<150 mm) or 40% by number for catchable sized (>150 mm) hatchery fish. Since 1998, stocking effort by the Department averaged about 1,590,000 fingerlings and 56,000 catchables. In terms of mass stocked, effort was about 21,555 kg (9,416 kg of catchables and 12,139 kg fingerlings). Using the average stocking effort, the overall return for catchables was 2% by number and 15.4% by weight. For fingerlings, the overall return was 0.3% caught by number and 63.7% by weight (Table 2). Because of a harvest rate of 91% of catch, return-to-creel analysis would be about 10% lower than the catch performance statistics.

Stocking catchable rainbow trout in Blackfoot Reservoir is prohibitively expensive. Cost per rainbow trout caught was $32.15 for catchables and $8.49 for fingerlings. Combined cost per hatchery rainbow trout caught in 2001 was an estimated $12.51. The best-case scenario cost estimate, using the lowest stocking effort since 1998, was $23.32 for catchables and $7.17 for fingerlings. This analysis clearly favors the fingerling stocking strategy.

If catch was exceptionally poor in 2001, our cost analysis would overestimate cost per fish caught. Summer creel surveys were completed on the reservoir in 1992 and 1994. Catch of rainbow trout was 1,752 in 1992 and 11,837 in 1997. Using the same average total stocking cost of $123,459.00 annually, cost per rainbow trout caught would have been $70.47 in 1992 and $10.43 in 1997.

Increasing the number of fish stocked in Blackfoot Reservoir does not appear to improve catch rates. Since 1967, catchable rainbow trout plants have ranged from zero in the late 1960s to 177,950 in 1996. Fingerling and fry plants ranged from 2,339,520 fish in 1968 to 104,228 fish in 1987. Since 1964, summer creel (5-6 month surveys) data show catch rates that ranged from 0.43 fish/h in 1970 to 0.06 fish/h in 1975. Mean catch rates by decade were 0.18, 0.26, and 0.15 for the 1970s, 1980s, and 1990s, respectively. Figure 13 shows catch rate trends in the reservoir since 1964. Surprisingly, we found no correlation between stocking efforts and catch rates (Table 3). Water storage also failed to explain a significant proportion of the variation in catch rates.

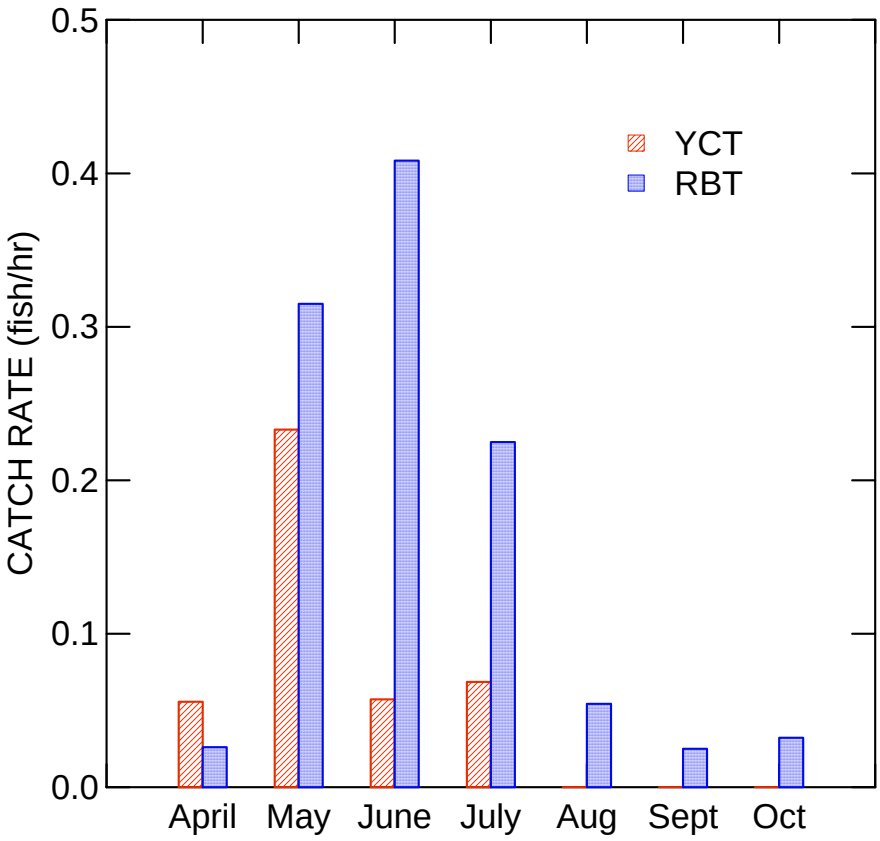


Figure 11. Catch rate (fish/h) for Yellowstone cutthroat trout (YCT) and rainbow trout (RBT) in Blackfoot Reservoir, 2001.

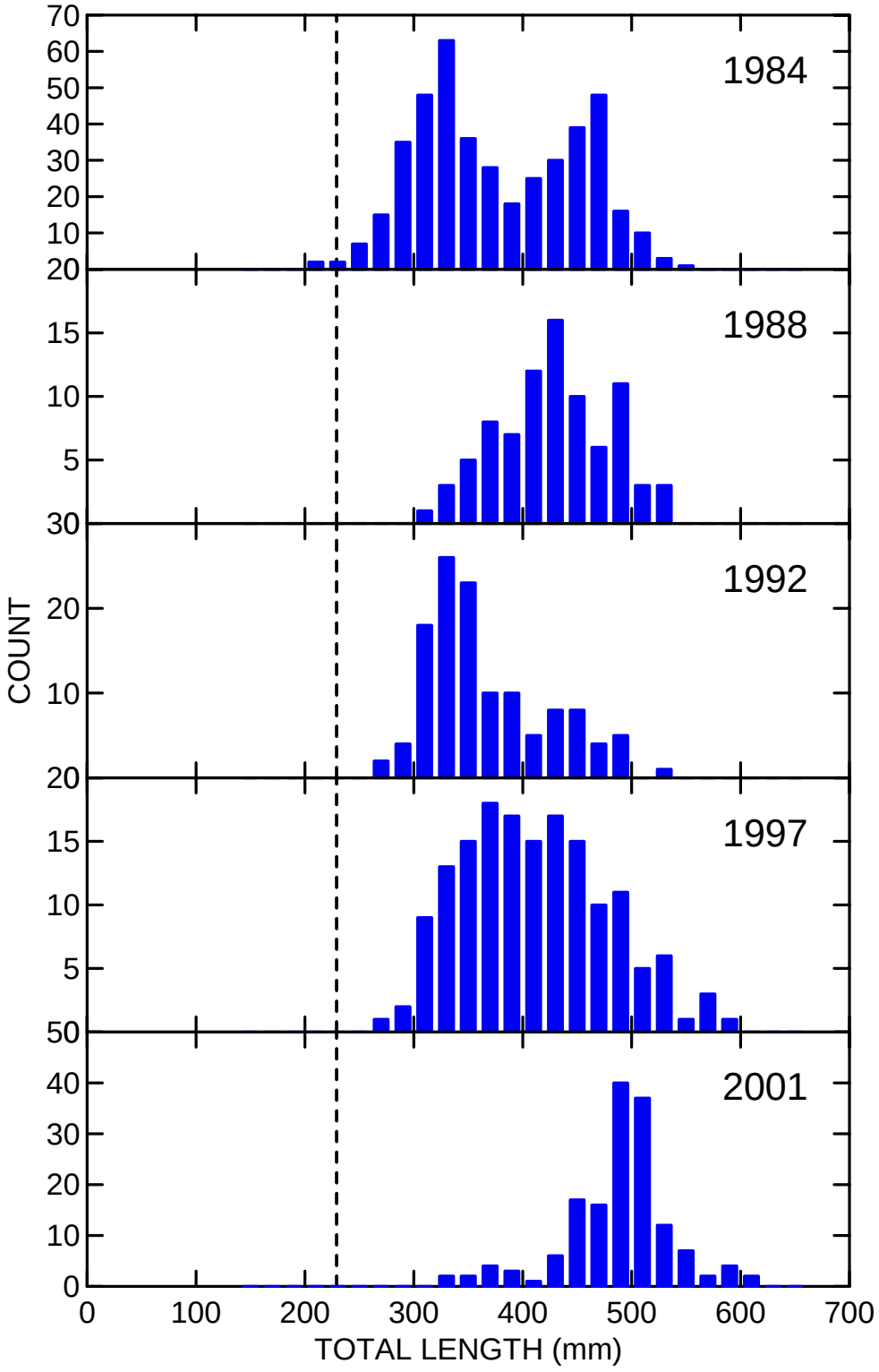


Figure 12. Length frequency distributions for rainbow trout measured during creel surveys on Blackfoot Reservoir. The vertical lines represent the mean stocking size of catchable rainbow trout (230 mm).

Table 2. Stocking effort (numbers and kg) and catch statistics for catchable and fingerling rainbow trout stocked in Blackfoot Reservoir. The mass and number of fish stocked represents the mean values from 1998-2001. Cost estimates assume a production cost of $3.86 per kg of fish produced.

Category	Catchables	Fingerlings
Mean kg stocked	9,416	12,139
Mean number stocked	56,000	1,590,000
Cost of stocking ($3.86 / kg)	$36,346	$46,857
Total catch	1,130	5,519
Mean length (mm)	474	487
Kg caught	1,453	7,727
Percent return by number	2.0	0.3
Percent return by weight	15.4	63.7
Cost per fish caught	$32.15	$8.49
Cost per lb caught	$11.34	$2.75

Table 3. Pearson correlation coefficients between catch rate (fish/h), stocking biomass, and water storage in Blackfoot Reservoir. Records from 1967 through 2001 were used in the analysis. For catch rate statistics, only complete summer creels (May-October) were used.

Category	**Catch rate**
Catch rate	1.000
Total kg of trout stocked	-0.018
Total kg of trout stocked with a 1 year lag	-0.078
Kg of fingerlings and fry stocked	0.133
Kg of fingerlings and fry with a 1 year lag	0.307
Kg of fingerlings and fry with a 2 year lag	-0.150
Kg of catchables	-0.082
Kg of catchables with a 1 year lag	0.212
Kg of catchables with a 2 year lag	-0.025
Maximum annual water storage	0.258
Minimum annual water storage	0.225
Maximum annual water storage with a 1 year lag	0.143
Minimum annual water storage with a 1 year lag	0.173
Maximum annual water storage with a 2 year lag	0.234
Minimum annual water storage with a 2 year lag	0.251

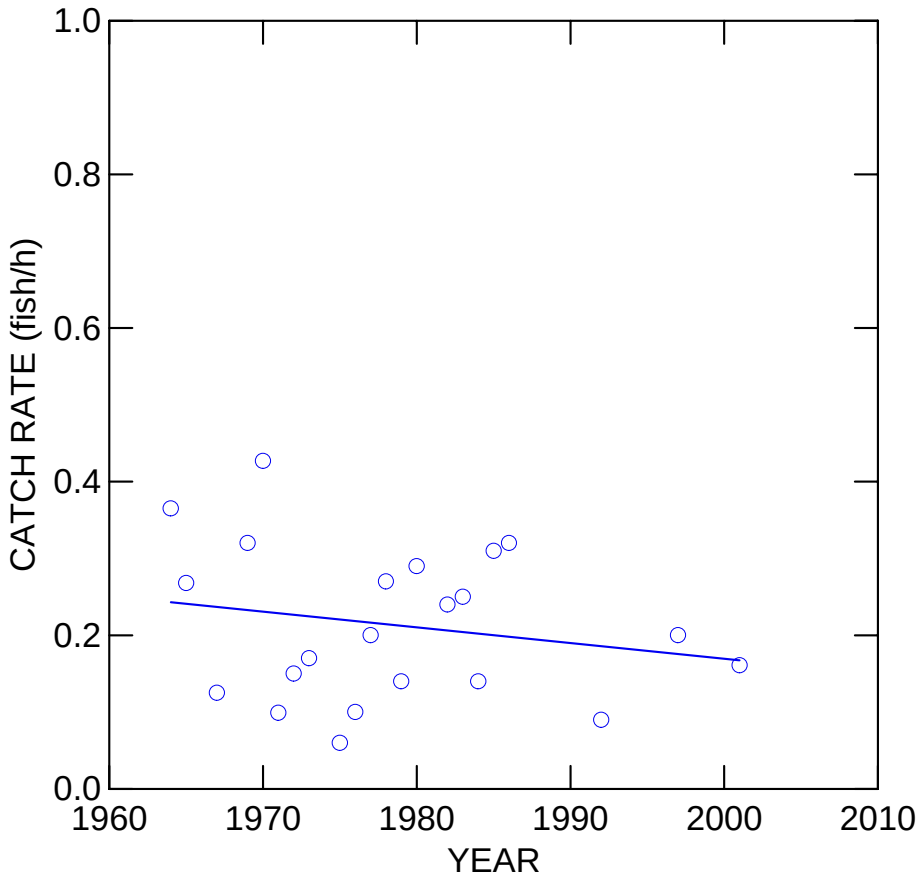


Figure 13. Catch rates on Blackfoot Reservoir since 1964.

Enhancing native cutthroat trout populations may be the best method of improving the Blackfoot Reservoir fishery. The current cutthroat trout population is completely supported by natural production - no direct cost from stocking - and made up 25% of the total trout catch.

Yellow Perch Trawling

Yellow perch were caught in all 12 trawls completed on October 15, 2001. Catch of yellow perch ranged from 7 to 564 per trawl with a mean of 142. Areal densities ranged from 73 to 5,907 perch/ha with a mean of 1,506. Yellow perch <100 mm total length dominated the catch (64%; Figure 14). The length frequencies also show a strong cohort of fish between 100 and 140 mm (14%). Utah chub were the second most abundant species caught in the otter trawl. Table 4 shows total catch of all species.

MANAGEMENT RECOMMENDATIONS

1. Continue monitoring yellow perch population status in Blackfoot Reservoir and evaluate their potential impacts (i.e., predators, prey, and competitors) on cutthroat trout enhancement efforts.

2. Continue stocking channel catfish in Alexander Reservoir and develop a monitoring program to evaluate stock performance.

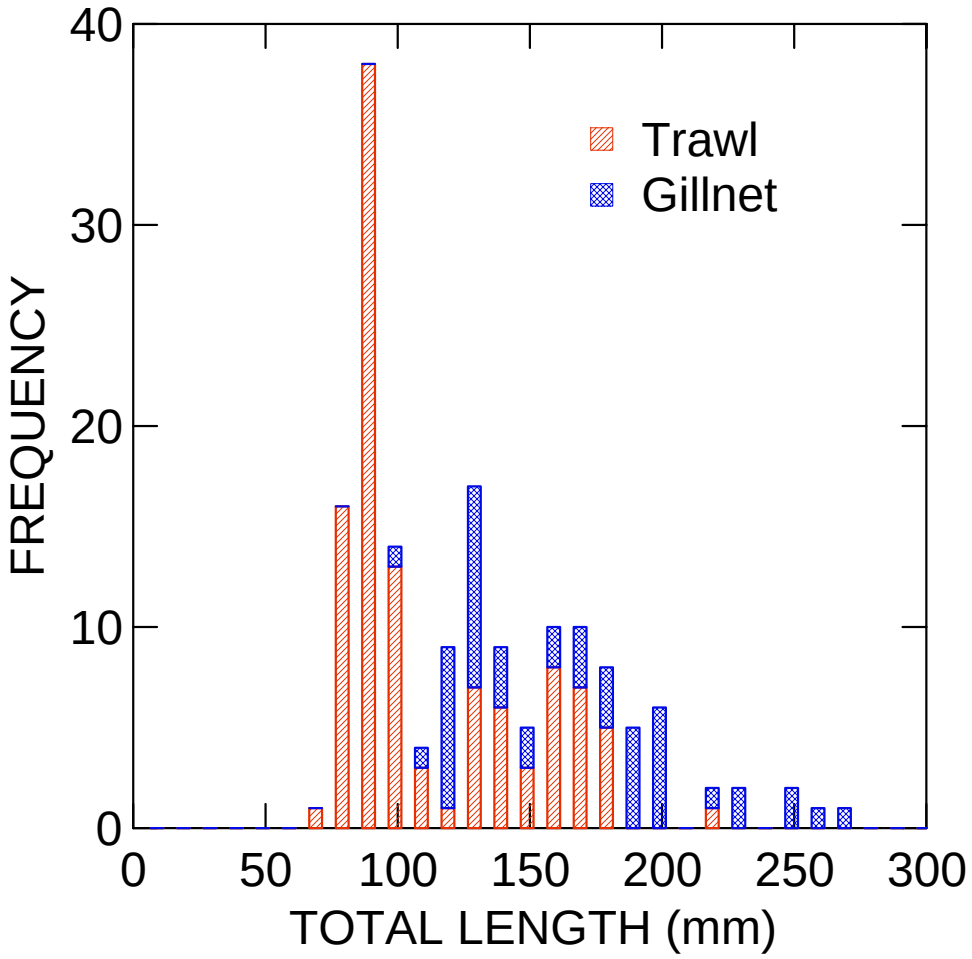


Figure 14. Length frequency distribution for yellow perch caught in the otter trawl and gill nets on Blackfoot Reservoir in 2001.

Table 4. Otter trawl catch on Blackfoot Reservoir from October 15, 2001.

Trawl	Yellow Perch	Rainbow Trout	Utah Sucker	Utah Chub	Sculpin *Cottidae spp.*	Common Carp
1	43	7	1	0	0	0
2	99	0	0	0	1	0
3	116	0	7	53	0	0
4	564	0	0	23	0	3
5	56	0	2	3	0	0
6	7	0	1	0	0	0
7	11	0	2	2	0	0
8	135	1	0	40	0	14
10	100	0	1	4	0	12
11	245	0	0	19	1	47
12	186	0	0	4	0	6
Mean	142.0	0.7	1.3	13.5	0.2	7.5
SD	157.3	2.1	2.1	18.3	0.4	14.1
SE	47.4	0.6	0.6	5.5	0.1	4.2

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2001 ANNUAL PERFORMANCE REPORT

State: Idaho | Program: Fisheries Management F-71-R-26

Project I: Surveys and Inventories | Subproject I-F: Southeast Region

Job: c | Title: Rivers and Streams Investigations

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

Total cutthroat trout *Oncorhynchus clarki* passage at the adult migration trap on the Blackfoot River was 4,747. Female cutthroat trout dominated the run at 3,147. Mean total length for spawners was 475 mm (S.D. = 41 mm) for females and 507 mm (S.D. = 47 mm) for males. A total of 37 rainbow *O. mykiss* and/or rainbow X cutthroat trout hybrids were collected at the trap. Lengths of those fish ranged from 330 mm to 550 mm. The rainbow trout made up 0.8% of the trout catch at the trap. In two adult migration traps on Spring and Diamond creeks, rainbow trout made up 0.2% of the catch.

A total of 128 rainbow trout were removed from 54 km of the Blackfoot River. The removal project was initiated to reduce the potential for introgression between the native Yellowstone cutthroat trout *O. clarki bouvieri* and hatchery stocked rainbow trout. A total of 51 man-days (408 h) of effort were expended on the project. That effort results in an estimated 3.2 h/rainbow trout removed.

Authors:

Richard Scully
Regional Fishery Manager

David Teuscher
Regional Fishery Biologist

OBJECTIVES

1. Obtain current information for fishery management decisions on rivers and streams, including angler use, success, harvest and opinions, fish population characteristics, spawning success, habitat characteristics, return-to-the-creel for hatchery trout and develop appropriate management recommendations.

INTRODUCTION AND METHODS

Blackfoot River

The Blackfoot River drainage is located in central Caribou County (Figure 1). The upper Blackfoot River begins at the confluence of Lanes and Diamond creeks approximately 60 km above Blackfoot Reservoir. Primary tributaries to the Blackfoot River include Lanes, Diamond, Sheep, Angus, Timothy, Spring, Slug and Trail creeks. Blackfoot Reservoir was constructed in 1909. The construction completely blocked interchange between downriver and upriver populations of Yellowstone cutthroat trout. The upriver population, however, quickly adjusted to the reservoir conditions by developing a successful adfluvial life strategy (Schill and LaBolle 1990). The Blackfoot River and its tributaries provide spawning and juvenile rearing habitat. At age-1, most of the cutthroat trout migrate downstream to the reservoir where they spend two to three years before returning to the river to spawn (Thurow 1981). Typical spawning size of the adfluvial form ranges between 400 and 600 mm total length.

Harvest records best describe historical population levels of Yellowstone cutthroat trout in the upper Blackfoot River drainage. In 1958, approximately 14,000 YCT were harvested from the Blackfoot River, of which 45% were greater than 400 mm in length (Cuplin 1961). Estimated harvest declined to about 6,000 in 1978 and only 1,000 Yellowstone cutthroat trout were harvested in 1988 (Schill and LaBolle 1990). The precipitous declines in harvest motivated fishery managers to restore the fishery. Historical records were summarized and discussed with concerned anglers. This led to development of a formalized fishery management plan for the upper Blackfoot River and Blackfoot Reservoir (Schill and LaBolle 1990). This unique document has guided Yellowstone cutthroat trout restoration efforts in the upper Blackfoot River drainage for the past decade. Closing harvest and habitat improvements to riparian areas in the upper Blackfoot River are the principal components of the recovery action to date. We have been monitoring the efficacy of those actions by observing the abundance of mature cutthroat that ascend the river to spawn. In 2001, we operated the adult migration trap from March through June and from September through October. The location of the trap is shown in Figure 1. The fall trapping was completed to observe if any fall spawning Hayspur strain rainbow trout were ascending the river to spawn.

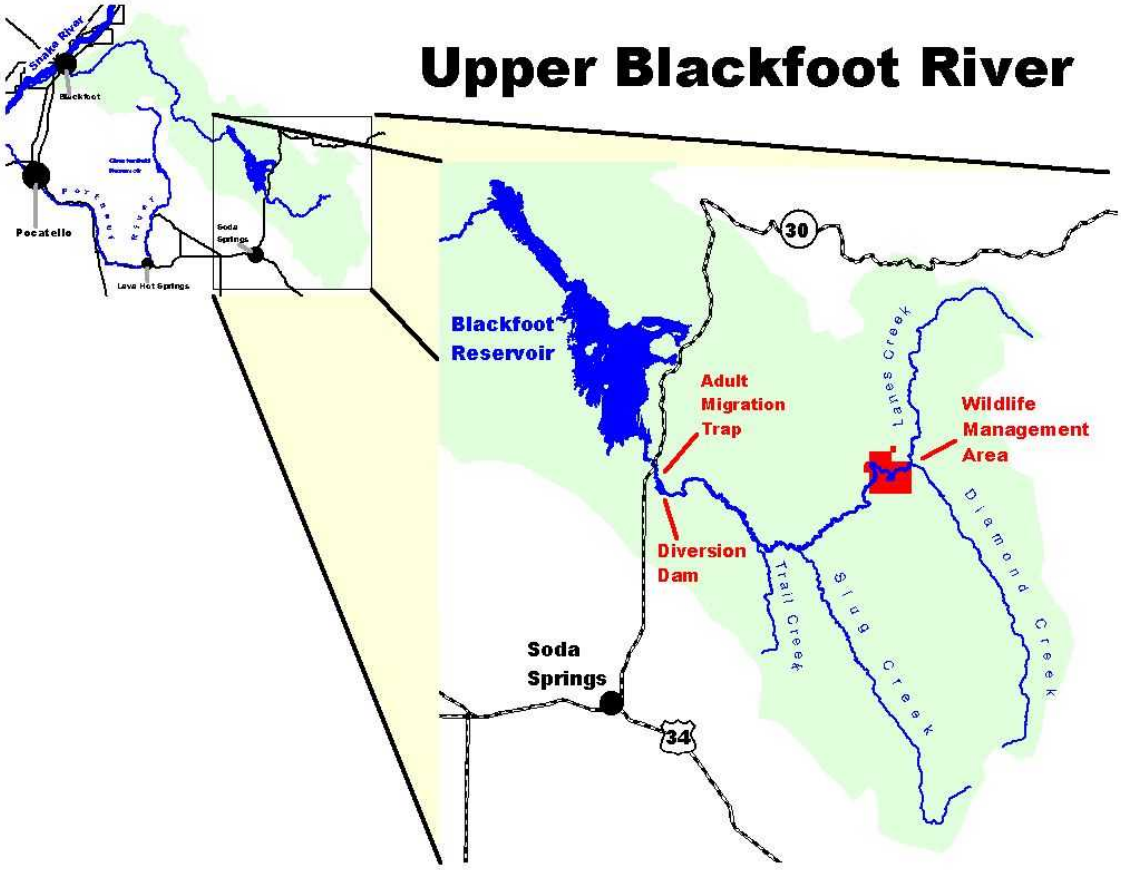

Figure 1. Upper Blackfoot River drainage showing the adult migration trap, the Wildlife Management Area, and the diversion dam on the Blackfoot River.

During the spring trapping period, we identified migrants as cutthroat, rainbow, or rainbow X cutthroat trout hybrids. All fish that were visually characterized as hybrids or rainbow trout were removed from the system. Most of the rainbow trout and hybrids were transported to Dike Lake. Dike Lake is isolated from the Blackfoot River system. In addition to removing rainbow trout caught at the trap, we set up two additional traps on Diamond and Spring creeks. The purpose of the additional traps was to remove resident rainbow trout that may be migrating upstream to spawn at the same time as the native cutthroat trout.

In 2001, a rainbow trout removal project was initiated on the upper Blackfoot River. The objective of the program was to minimize genetic introgression between Yellowstone cutthroat trout and hatchery stocked rainbow trout. There were two methods used to minimize introgression. First, hatchery stocking in the reservoir was converted to sterile fish in 1999. Secondly, in 2001, we began a rainbow trout and hybrid removal project by collecting fish with boat electrofishing. We sampled most of the upper Blackfoot River (about 60 km) between the confluence of Diamond and Lanes creeks downstream to the adult migration trap (Figure 1). A 6 km section of river within the Hunsaker property was not included in the removal project. Rainbow trout collected during the electrofishing effort were transported to Dike Lake or sacrificed.

RESULTS AND DISCUSSION

Spawning Run Observations

Yellowstone cutthroat trout began entering the spawning trap during the first week in May. Peak migration occurred on May 16 when 667 cutthroat trout were counted. Figure 2 shows migration timing and abundance. Migration timing was similar for male and female cutthroat trout. Unlike most years, high water during peak water runoff did not shut down trapping operations. Therefore, total escapement of Yellowstone cutthroat trout could be estimated. Total cutthroat trout passage was 4,747. Female cutthroat trout dominated the run at 3,147. Mean total length for spawners was 475 mm (S.D. = 41 mm) for females and 507 mm (S.D. = 47 mm) for males. The size of cutthroat trout at the trap was similar to size of fish collected at the trap during the 1970s (Figure 3). A total of 37 rainbow and/or rainbow x cutthroat trout hybrids were collected at the trap. Lengths of those fish ranged from 330 mm to 550 mm. All of the rainbow trout and hybrids were either sacrificed or transported for release to Dike Lake. Rainbow trout made up 0.8% of the total catch. In migration traps located upstream on Diamond and Spring creeks, an additional three rainbow trout were caught and removed from the system. In those traps, a total 1,227 cutthroat trout were caught. The rainbow trout proportion caught in the tributary traps was 0.2%.

Recent trap counts suggest that the Yellowstone cutthroat trout population in Blackfoot Reservoir is increasing. Trap counts were 575, 521, 1,663, and 4,747 for 1991, 1992, 1995, and 2001, respectively. The increase in numbers may be related to the closure of harvesting naturally produced cutthroat trout beginning in 1990 on the reservoir and followed by a closure in the river in 1998. The increase in abundance has also been demonstrated in the recreational fishery on Blackfoot Reservoir. The 2001 creel survey showed that 25% of the total trout catch in the reservoir was Yellowstone cutthroat trout. No cutthroat trout were caught by anglers interviewed during the 1992 survey.

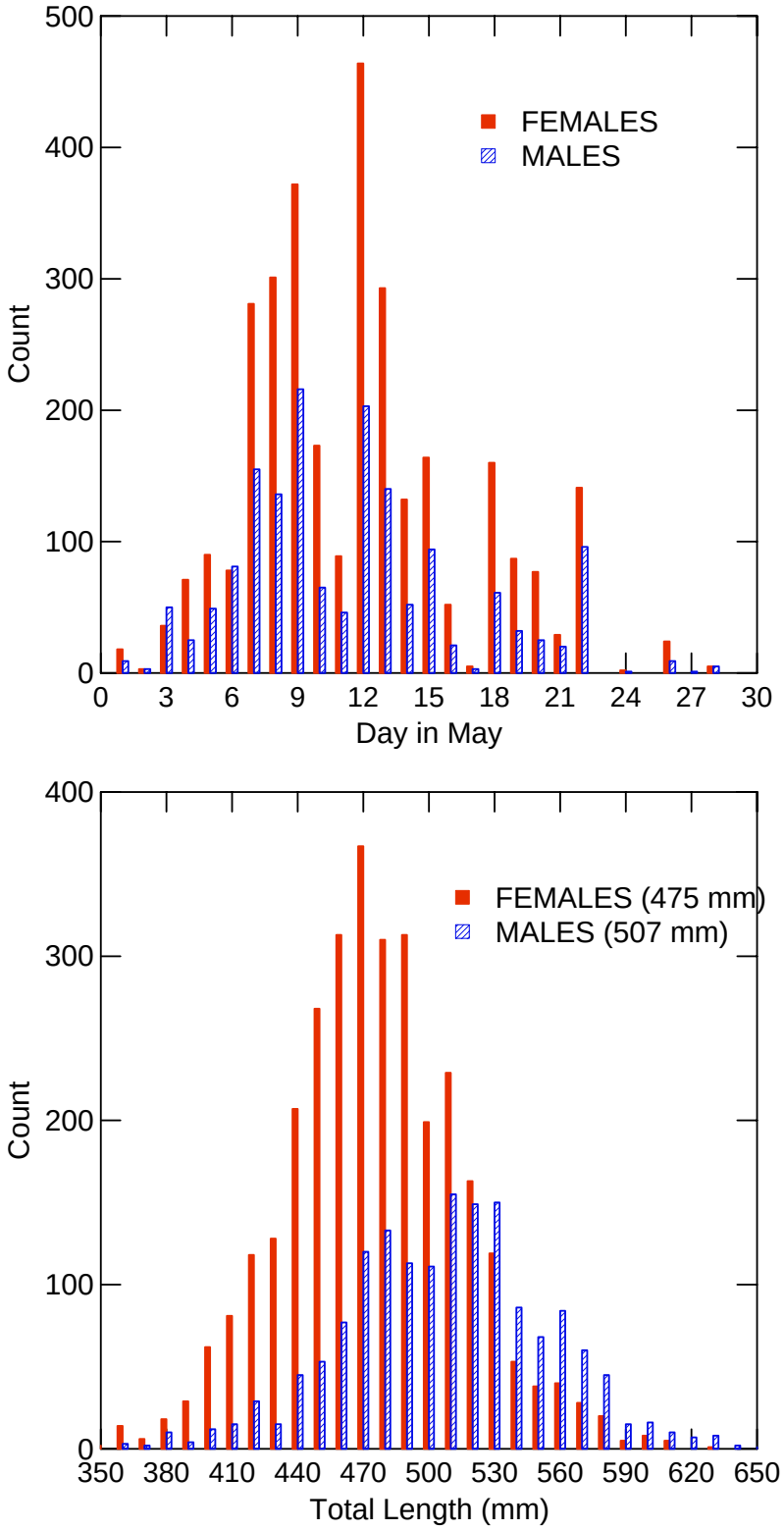

Figure 2. Migration timing and fish length measurements of Yellowstone cutthroat trout caught at the adult migration trap on the Blackfoot River in 2001.

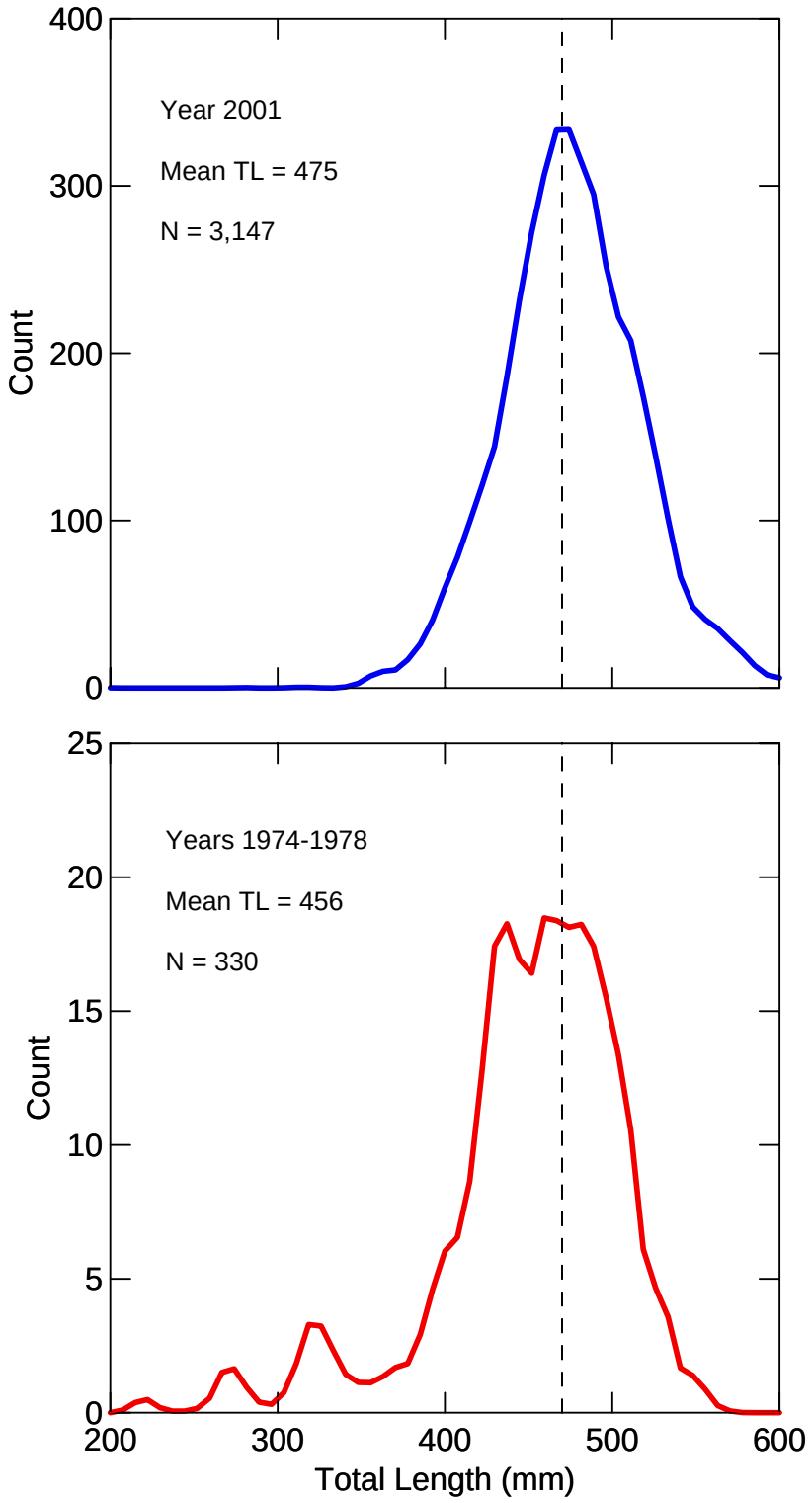

Figure 3. Comparison of length frequency distributions between the 1970s and 2001 for Yellowstone cutthroat trout caught at the adult migration trap on the Blackfoot River, Idaho.

Rainbow Trout Removal Project

We removed a total of 127 rainbow trout In the 54 km of Blackfoot River surveyed,. During the removal effort, 724 cutthroat trout were caught and released back to the river. The percent catch was 85% cutthroat trout and 15% rainbow trout. A total of 51 man-days (408 h) of effort were expended on the project. That effort results in an estimated 3.2 h / rainbow trout removed. In 2002, the removal effort will be repeated. However, sampling will consist of a continuous float trip that will cut down on travel time. Additionally, in 2002, we intend to complete a mark-recapture population estimate for as much of the 54 km of river as possible. The population estimate can be used as a tool for evaluating the effectiveness of the rainbow trout removal project. For example, repeating the mark-recapture population estimate after three years of rainbow trout removal will provide a quantitative method for evaluating the success of the project.

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2001 ANNUAL PERFORMANCE REPORT

State: Idaho Program: Fisheries Management F-71-R-26

Project II: Technical Guidance Subproject I-F: Southeast Region

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

We provided input to the Regional Environmental Staff Biologist on activities affecting fish and anglers. We coordinated with personnel of various agencies on hydropower, mining, road-building, stream alteration, grazing allotments, fill/excavation, and other projects. Southeast Region fisheries personnel worked with anglers to improve rapport and open communication with the public.

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2001 ANNUAL PERFORMANCE REPORT

State: Idaho Program: Fisheries Management F-71-R-26

Project III: Habitat Management Subproject I-F: Southeast Region

Contract Period: July 1, 2001 to June 30, 2002

ABSTRACT

Idaho Fish and Game Department (Department) employees and Southeast Idaho Fly Fisher volunteers maintained two miles of riparian corridor fence along reaches of the upper Portneuf River. We also conducted regular repairs to this fence and removed trespass livestock as needed.

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Submitted by:

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Approved by:

Dexter Pitman
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